Teaching the History and Philosophy of Astronomy

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ASTROEDU
Toronto, Canada 2023

Motivation

Astronomy is a subject with a rich and long history, and connections to the development of some of the most important ideas in the history of physics. The philosophical implications of the subject are often neglected in introductory survey courses. A framework is presented for teaching the history and philosophy of astronomy in a way that engages students, and lets them work in small groups, and encourages them to develop writing and reasoning skills. The class is enlivened by short videos and debates. This type of class appeals to a broad range of non-science college students. The associated poster video gives a brief overview of the course.

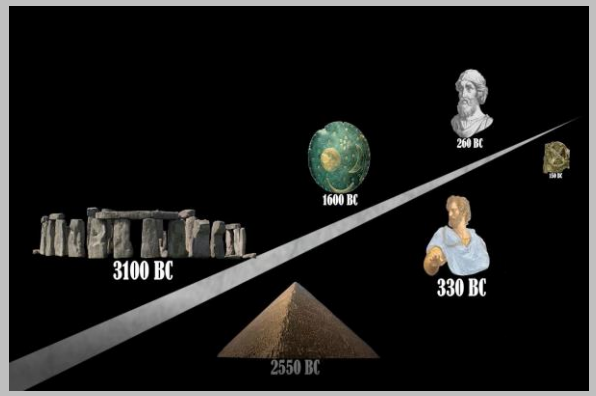
Learning Goals

This course is for non-science majors, and it does not assume any prior astronomy knowledge. Such students may not need astronomy after college but can benefit from an appreciation for our understanding of how the universe works. Learning goals are to be able to:

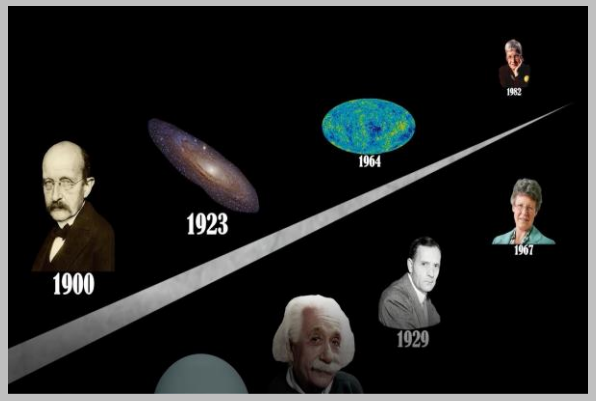
- Appreciate the role of logic and science method in advancing astronomy knowledge.
- Understand how different cultures conceived of space and time throughout history.
- Describe how dramatically our view of the universe has changed in the past century.
- Convey aspects of astronomy in a way that any non-science major would understand.
- Recognize the different roles of theory and observation in advancing our knowledge.
- Describe the relationship of astronomy to other fields of science, and also to religion.
- See how science strives for objectivity, but also operates as a human, cultural activity.
- Understand how philosophical thinking can work to advance astronomical knowledge.
- Demonstrate your comprehension of an astronomy topic in a multimedia presentation.

Pedagogy

The class divides into 13 weekly modules: Ancient Skies, Greek Science, Revolutions, Telescopes, Gravity, Evolution, Mapping, Relativity, Quantum Theory, Stars & Atoms, Galaxies, Big Bang, and Life in the Universe. The core content is 18 hours of video lectures, broken into shorter, 6-8 minute-topics, with associated slides. Half the class time is given to debates and discussion, with the students responding to weekly prompts in class, working in small groups, then doing an individual homework each week on a discussion topic selected from a small list. A semester project allows for the deeper exploration of one of the many topics of the class.



Section of a video timeline of major events in the history of astronomy, covered in the course. This section ranges from pre-history to the innovations of ancient Greek thinkers.



Section of a video timeline of major events in the history of astronomy, covered in the course. This section ranges from revolutions in physics to the discovery of dark matter.